

Remarks/Arguments:

Claims 1-6, 8, 10-17, 19 and 30-48 were pending at the time of the Office Action. Claims 31-34 and 48 are canceled herewith, and new claims 49-55 are added.

Double Patenting

Claims 1-2, 6, 8, 30-32, 34, 36-38 and 42-48 are rejected on the ground of nonstatutory obviousness-type double patenting as unpatentable over claims 1-3, 7, 14, and 19 of U.S. Patent 5,772,905, in view of Gebhardt, U.S. Patent 5,731,086 ("Gebhardt"). The rejection states that the rejected claims differ from those of U.S. Patent 5,772,905 by not teaching deformability of the composition at less than 200°C, and relies on Gebhardt to supply that feature. Independent claims 1, 30 and 38 are amended to recite the presence of an internal mold release agent in the polymeric composition, a feature that is not disclosed in either U.S. Patent 5,772,905 or Gebhardt. Support can be found in the specification on page 17 at line 3. Since the combination of references does not teach all of the claim features, *prima facie* obviousness is not supported and the rejection should be withdrawn. Claims 1 and 30 are also amended to recite a step of photocuring, thermally curing, or both thermally curing and photocuring the polymeric composition, as supported in claim 45.

35 USC § 103

Claims 1-2, 6, 8, 16-17, 19, 30-32, 34-36, 38 and 42-48 are rejected under 35 USC § 103(a) as unpatentable over Jan Haisma, *et al.*, 1, Vac. Sci. Technol. B, 14(6), 4124-4128 (Nov/Dec. 1996) ("Haisma") in view of Gebhardt. This rejection is respectfully traversed. The rejection states, incorrectly, that Haisma teaches the use of a UV-curable polymer. He does not. Rather, he teaches compositions that include UV-curable monomers such as HDDA and HEBDM. See section A. on page 4124. These compounds are not polymers. Rather they become polymers only after having been exposed to UV light, thereby forming features smaller than 100 nm in size. It is the objective of Haisma's work to form such features using a photopolymerization process. See the Abstract: "First, a photopolymerization-replication step is carried out ...". This is photoinitiated formation of a polymer, not curing of an already-existing UV-curable polymer.

The rejection asserts that it would have been obvious to modify this process by instead using Gebhardt's thermosetting polymer composition. Office Action, page 6. But

doing so would result in a process that would not work because it would merely result in a thermally curable composition. Haisma requires a photocurable composition. As noted in the MPEP at 2143.01 V:

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)

Thus, there would have been no motivation to modify Haisma's technique in the manner proposed by the Office, and *prima facie* obviousness has not been established. Additionally, the rejection does not provide the feature of including an internal mold release agent, and thus not all of the claim elements are taught. For both of these separate reasons, the rejection should be withdrawn.

Claims 3, 10-12, 14-15 and 39 are rejected under 35 USC § 103(a) as unpatentable over Haisma in view of Gebhardt and further in view of Harmening (Molding of Three Dimensional Microstructures by the Liga Process). The Office states that "... Harmening clearly teaches to use a photo-curable polymer capable of crosslinking ... (i.e. PMMA)." Applicants disagree, and respectfully point out that PMMA is a polymer but not a photo-curable polymer, because PMMA has no polymerizable groups on it.

Harmening teaches that PMMA is useful as a photoresist for deep-etch X-ray lithography. As is known in the art, in this technique a conducting substrate is coated with an X-ray resist (PMMA in this case) and exposed to synchrotron radiation through a mask. The resist is developed and the exposed areas are dissolved, e.g., with tetrahydrofuran in Harmening's case. See Harmening page 203, 2nd column, 1st and 2nd full paragraphs.

In Harmening's process the PMMA is degraded by X-rays and removed with a solvent. It does not photopolymerize, a step that is essential for Haisma's process. Therefore, replacing Haisma's photopolymerizable monomers with PMMA would not result in a photopolymerizable composition as required by Haisma. Since the proposed modification would render Haisma's composition unsatisfactory for its intended purpose, *prima facie* obviousness has not been established and the rejection should be withdrawn.

Claims 4, 13, 33, 37 and 40 are rejected under 35 USC § 103(a) as unpatentable over Haisma and Gebhardt in view of US Pat. No. 5,981,616 ("Yamamura"). Applicants

understand that this rejection is two-fold: Haisma in view of Yamamura, and Gebhardt in view of Yamamura. The rejections rely on a contention that using an epoxy resin or polysiloxane as disclosed by Yamamura in either Haisma's or Gebhardt's system would have been obvious because Yamamura's composition provides excellent mechanical strength and minimizes shrinkage. Applicants respectfully disagree. The rejection provides no reason why the person of ordinary skill would have concluded that the epoxy resin or polysiloxane is responsible for the alleged good performance of Yamamura's compositions. In fact, specifically regarding epoxy resins, Yamamura says that "Also, three-dimensional objects prepared by photo-fabrication using resin compositions including a cationically photo-polymerizable compound containing a conventionally known epoxy compound are not provided with sufficient toughness required for the trial mechanical parts used for confirming the functionality." Col. 2 lines 33-38. As for polysiloxanes, these are merely mentioned as one of many possible types of polymer that can be terminated with the required oxetane groups. Col. 3 lines 32-37. Yamamura does not say that they provide any particular advantage that the person of ordinary skill might then want to obtain in other formulations.

The rejection also fails to provide any reason to expect that epoxy resins or polysiloxanes, which Yamamura always uses only in combination with both an oxetane compound and a cationic photoinitiator (which polymerizes the oxetane), would improve the performance of Haisma's or Gebhardt's compositions, neither of which uses either of these materials. In contrast to Yamamura's cationic curing system, Haisma and Gebhardt use radical sources. It is well known in the art that compositions curable by radicals frequently cannot be cured by cations, and vice versa. For all of these reasons, the person of ordinary skill would have had no reason to add an epoxide or a polysiloxane to either of Haisma's or Gebhardt's compositions. In the absence of a reason to make the combination, *prima facie* obviousness has not been established and the rejections should be withdrawn.

Claims 5 and 41 are rejected under 35 USC § 103(a) as unpatentable over Haisma in view of Gebhardt and further in view of US 2002/0102490 A1 ("Ito"). The rejection states that Ito teaches the use of alkyl methacrylate or fluorinated alkyl methacrylate monomers in his compositions, but this assertion is incorrect. Ito teaches only polymers that contain repeating units derived from such monomers. Ito does not teach including the monomers in a curable composition of any sort. Thus, Ito would not have provided the person of ordinary

skill with a reason to include such monomers in Haisma's compositions. Therefore, *prima facie* obviousness has not been established and the rejection should be withdrawn.

New claims 49-55 are added, as supported by claim 3 and throughout the specification. Claim 3 is amended to correct a typographical error, and several other claims have been amended for clarity or to provide proper antecedent basis. No new matter has been added.

Conclusion

For the reasons cited above, Applicants submit that the claims are in condition for allowance, and respectfully request reconsideration and notification of same. Applicants invite the examiner to contact their undersigned representative, Frank Tise, if it appears that this may expedite examination.

Respectfully submitted,

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